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Valuation of Urban Parks Under the Three-Level Park System in Shenzhen: A Hedonic Analysis

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Abstract: Urban parks play a pivotal role in fostering ecologically advanced cities in China, contributing significantly to enhancing urban environments and the overall quality of life for residents. However, their value is often hard to quantify by urban planners due to the absence of a clear market price. Using the hedonic price method, this study delves into the distinct impacts of different types of urban parks (community parks, city parks, country parks) on housing prices under the three-level park system in Shenzhen. The outcomes reveal that owning a view of both city parks and country parks from the apartment has significant positive influence on housing prices, with a premium of 14.8916% (RMB 920,396.73) and 30.7299% (RMB 1,899,309.15), respectively. Regarding accessibility, shortening walking distance by 100 m to the nearest community park and city park can attach a premium to the housing price by 0.3269% (RMB 20,203.55) and 0.6130% value gain (RMB 37,889.53), respectively. The results drawn from distinctive park types are expected to give insights to urban planners in formulating strategies for ecological civilization construction, with an emphasis on prioritizing visible and accessible greenspaces to cater to citizens' preferences and foster sustainable urban growth.

Keywords: urban park; hedonic price model; 3-D spatial model; multilevel model

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1. Introduction

Rapid urbanization is presenting numerous challenges to Chinese cities, one of which is the declining quality of life for their residents [1–4]. In response, the concept of ecological civilization construction has gained prominence and become a national policy goal in China. Urban planners and researchers have increasingly focused on city beautification campaigns, which aim to create esthetically pleasing and ecologically functional urban spaces that prioritize beauty, order, and public areas [2–6]. As an important component of urban blue–green spaces, urban parks (UPs) play a fundamental role in improving the quality of living in urban areas because they can produce many types of benefits for the inhabitants [6–9].

This study addresses two critical research questions that delve into the intricate relationship between urban parks and housing markets in Shenzhen. Firstly, it seeks to ascertain the manner in which various types of urban parks—community, city, and country—exert influence on housing prices, and to quantify the premiums that are linked to their proximity and visibility. Secondly, the study aims to evaluate the relative significance of park views and accessibility in determining the hedonic value of urban parks, and to explore how these attributes shape residents' preferences and inform urban planning strategies.

Drawing on the hedonic pricing method, a well-established approach in environmental economics, this study offers a fresh perspective by applying it to the specific context of urban parks in Shenzhen. Unlike previous studies that have broadly examined environmental amenities, this research delves into the intricate relationship between the spatial distribution of parks and housing prices, accounting for the unique characteristics of high-density urban areas. By incorporating data and housing market fluctuations, this study innovates within the hedonic pricing framework, providing a more precise assessment of how accessibility to urban parks influences property values.

The main contribution of this study is to unveil the value of different types of UPs perceived by homebuyers, using Shenzhen as a case study. Shenzhen stands as an exemplary city for investigating the nexus between UPs and housing prices for two compelling reasons. First, Shenzhen has earned its reputation as a genuine "Park City", boasting over 1200 parks, including a plethora of community parks, city parks, and country parks. Second, this populous city boasts a substantial volume of real estate and residential transaction data, offering invaluable insights into the factors influencing homebuyers' decisions.

2. Literature Review

The city beautification campaigns in China have emphasized the creation of public spaces, parks, and boulevards to enhance the quality of life of urban residents. For example, in 2019, the Beijing Municipal Commission of Planning and Natural Resources announced plans to invest 11 billion yuan (USD 1.6 billion) in new parks and green spaces. Similarly, Guangzhou invested 1.8 billion yuan (USD 261 million) in 2018, as reported by the Guangzhou Forest and Landscaping Bureau. Shenzhen allocated 1.5 billion yuan (USD 218 million) for similar incentives, according to the Shenzhen Municipal Bureau of Planning and Natural Resources.

Urban parks (UPs) are integrative zones that cleverly meld water features with verdant landscapes. Encompassing elements such as rivers, lakes, wetlands, and parks, these areas assume a pivotal role in bolstering urban sustainability, alleviating the impacts of climate change, providing social spaces for recreation, and ameliorating the mental health and well-being of urban inhabitants [6,10,11]. The literature on urban greenspace accessibility and its correlation with human well-being is extensive, with studies highlighting the premium on property values associated with views of parks and greenspaces [12]. The review reveals that the relationship between urban greenspace and well-being is complex, involving not only physical access but also the quality of the experience and psychological benefits derived from interaction with nature. This nuanced understanding is crucial for urban planning and policy, emphasizing the need to prioritize visible and accessible green spaces to meet residents' preferences and foster sustainable urban growth [6].

To give evidence-based insights into the investment of UPs, the hedonic price method has been widely adopted [7,9,13], but empirical studies in China remain limited. Most studies measure homebuyers' willingness to pay a premium for the proximity and visibility of the UPs [14–18] but fail to consider the types of UPs. It is rational to assume a higher premium attached to a national forest park than a community-level park. Therefore, to precisely communicate the hedonic value of different types of UPs to the public, stakeholders, and policymakers, it is vitally important to separate the effects of extrinsic utility derived from proximity and visibility from the effects of intrinsic property derived from a type of UP.

Building upon the significance of urban parks (UPs) as integral components of urban blue–green spaces, our study extends the current discourse by elucidating the quantifiable benefits these parks confer upon the urban fabric. Utilizing the hedonic pricing model, this study dissects the nuanced influence of various park types—community, city, and country—on housing values within Shenzhen's multi-tiered park system. The analysis underscores the substantial premium associated with park views and the incremental value derived from enhanced accessibility, providing a comprehensive assessment of UPs' contributions to property value and urban livability.

3. Methodology

3.1. Shenzhen and Its Three-Level Park System

Shenzhen (22°27′–22°52′ N, 113°46′–114°37′ E), a modern and rapidly developing city located in the southern part of China, is one of the most populous and wealthiest cities in China, with a population of over 13 million people and a GDP of over USD 350 billion. As one of China's emerging cities, Shenzhen has sought to incorporate green construction in its development and has been entitled "National Garden City" and "International Garden City". According to a UP development planning document released by Shenzhen Municipal Bureau of Planning and Natural Resources [19–21], Shenzhen has devoted over 50% of its total land area to blue–green spaces, prominently featuring 310 rivers and 161 lakes and reservoirs. The city boasts a 260 km coastline, encompassing 50 natural beaches, and is home to a diverse array of more than 3000 species of flora and fauna, showcasing its rich biodiversity. The city has also orchestrated the creation of 1206 parks and an extensive network of 2843 km of greenways. This intricate ecological network seamlessly connects mountainous, maritime, and urban habitats, solidifying its praise as a "city of a thousand parks".

The methodology employed in this study acknowledges the nuanced distinctions between rental apartments and owner-occupied residences, which may influence the perceived value of urban park views. To ascertain whether residences or apartments actually have views of urban parks, this study utilizes detailed geospatial data and aerial imagery from Baidu Maps. Such data can accurately determine the line of sight and proximity of each property to the nearest park, thus confirming the presence of park views. ArcGIS (version 10.8.1) was used for all spatial data analysis.

The difference in views between rental apartments and owner-occupied residences could indeed make a difference in the results, as property owners might place a higher premium on park views due to the long-term investment in their homes. This distinction is crucial for understanding how the hedonic value of urban parks varies across different types of housing tenure. In order to avoid the difference between rental and commercial housing, the samples selected for this study are all commercial housing transaction data, and there are parks that can be reached on foot near the community.

This study acknowledges the complexity of park types and their spatial features, recognizing that treating all parks of the same type as homogeneous may oversimplify the analysis. Future research will delve into the characteristic indicators (i.e., green area, number of public gyms and shower rooms, year of construction, etc.) within park types to account for the spatial disparities that could skew the results. By incorporating a more nuanced approach that considers the unique attributes of each park, the study aims to provide a more accurate assessment of the impact of urban parks on housing prices in Shenzhen. This will involve a detailed analysis of park features such as size, amenities, and maintenance, which are known to affect visitors' positive emotions and park use, as well as their potential influence on property values.

Additionally, the study concedes that the absence of survey or qualitative data limits the explanatory power of the hedonic pricing model in this context. To address this, future research will include such data to verify the alignment between park proximity, visibility, and residents' preferences and behaviors. This approach will offer a more robust interpretation of the findings by integrating residents' perspectives on the value of urban parks, which is crucial for understanding the true impact on housing prices. By leveraging social media data and deep learning-based sentiment analysis to quantify visitors' positive emotions in urban parks, the study will be better positioned to understand how the different types and landscape attributes of parks influence residents' experiences and, by extension, the housing market.

Shenzhen is advocating a lively scene of "open the window one can see the green, open the door one can see the park", in that there should always be a park in walking distance to every inhabitant. Shenzhen encompasses 1206 parks distributed across 11 districts, and it has a systematic classification system that generally divides parks into three types: 33 country parks, 181 city parks, and 992 community parks (Figure 1). Table 1 shows the explicit definition of the three types of parks. The hierarchical three-level park system is created with the specific goal that all citizens can access the community parks within 500 m (a walkable distance to serve the needs of the immediate community and neighborhood), city parks within 2 km (a proper distance to provide recreational opportunities for the surrounding communities), and country parks within 5 km (an accessible distance to provide recreational uses with conservation initiatives). There is also a fourth category called park-like space, referring to an area or environment that resembles or has characteristics similar to a park, which can be found in various settings, including urban areas, residential neighborhoods, commercial districts, and public institutions.

Figure 1. Illustration of the three-level park system in Shenzhen.

Table 1. Description of the three-level park system in Shenzhen.

Types	Amount	Description
Country park	33	A large area of land that is designated for recreational use and conservation purposes.
City park	181	Typically smaller in size than a country park and designed to provide recreational opportunities for the surrounding community.
Community park	992	Similar to a city park but is typically smaller in size and more focused on serving the needs of a specific community or neighborhood.

3.2. Data

A total of 24 commercial residential complexes across 8 districts in Shenzhen were selected, including 16,985 samples of newly constructed, first-hand residential apartments transacted on the free market between January 2016 and December 2017 [12,22], during which time the construction of many parks under the three-level park system was completed, therefore allowing for at least one community park located within 500 m, one city park within 2 km, and one country park within 5 km to the apartment (Figure 2).

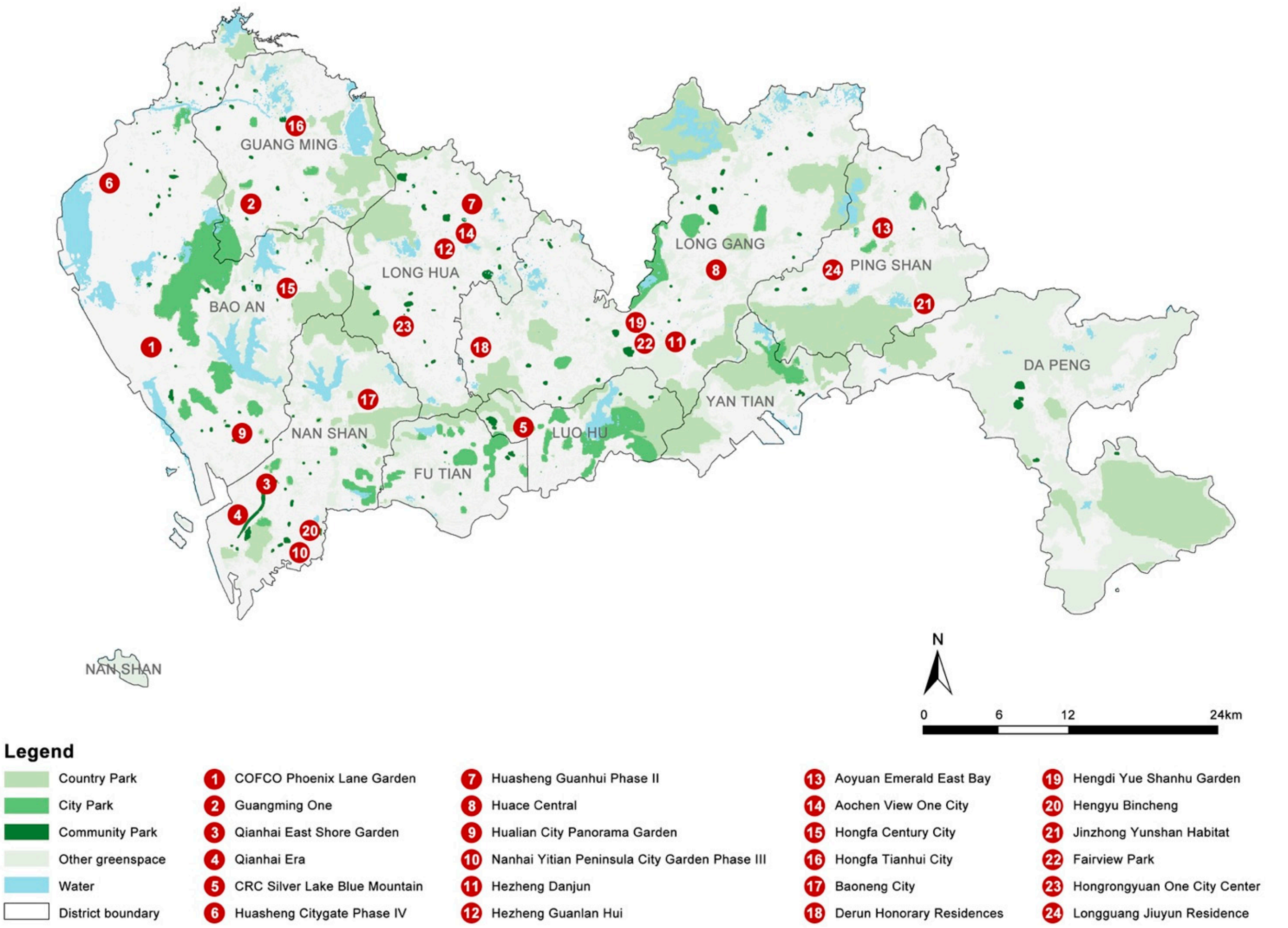

Figure 2. The map of study area, the sampling complexes, and the distribution of different types of UPs.

The study's dataset, which captures the period from January 2016 to December 2017, offers a valuable snapshot of the relationship between urban parks and housing prices in Shenzhen. However, it is important to note that the intervening years have been marked by transformative events that have reshaped the urban landscape and housing market dynamics. This study's analysis, while robust for the specified timeframe, may not fully encapsulate the effects of subsequent real estate turbulence, the COVID-19 pandemic, and changes in national urban construction policies. These factors have undeniably influenced the value of urban parks in the context of current housing prices. Future research will benefit from incorporating more recent data to account for these shifts, ensuring that the assessment of urban parks' impact on housing values remains current and reflective of the evolving urban environment in Shenzhen.

Based on the theory of the hedonic pricing method, housing prices can be interpreted by the structural, locational, neighboring, and environmental attributes:

$$P = f(S, L, N, E)$$

where P is housing price and S, L, N, E are structural, locational, neighboring, and environmental variables. Table 2 shows a detailed description and summary statistics of all variables. The dependent variable is represented by the apartment transaction price, which is derived from the China Real Estate Index System (CREIS) recognized as one of the most reliable and comprehensive real estate databases in China operated by the China Index Academy, which collects both first-hand and second-hand transaction data from more than 300 Chinese cities. All transaction prices are adjusted to the prices as of December 2017 based on the monthly commercial residential housing price indices for Shenzhen (published monthly by the Shenzhen Housing and Urban–rural Construction Committee). The CREIS database also includes basic structural variables of each apartment, such as the total usable area of the apartment (AREA), floor level (FLOOR), and the number of bedrooms (BEDROOM) [12]. We also include some locational and neighboring variables such as having a subway station within 500 m (SUBWAY), having a hospital within 1500 m (HOSPITAL), distance to the central business district (D_CBD), and location in the catchment zone of key elementary school (SCHOOL_E) and key junior high school (SCHOOL_JH). As the major focus of this study is to investigate homebuyers' preferences for viewing and accessing different types of UPs, a total of six interested variables were selected, including owning a view of the nearest community park (V_PARK_COMM), the nearest city park (V_PARK_CITY), and the nearest country park (V_PARK_COUNTRY); walking distance to the nearest community park (WD_ PARK_COMM), the nearest city park (WD_ PARK_CITY), and the nearest country park (WD_ PARK_COUNTRY). We believe walking distance is a more reliable variable than direct distance in terms of the measurement of the accessibility to the park. It should be noted that for some complexes, walking distance from the apartment to the nearest park is slightly over the reference value suggested by the three-level park system (having at least one community park located within 500 m, one city park within 2 km, and one country park within 5 km), which uses direct distance for measurement.

Table 2. Descriptions and summary statistics of variables (total observations = 16,985).

Variable	Description	Mean	SD	Min	Max
Dependent variable					
PRICE	Adjusted transaction price of apartment (RMB [a])	6,180,650.87	5,342,999.04	827,495.25	55,533,557.90
Independent variable (apartment level)					
AREA	Total usable area of the apartment (m^2)	102.17	36.28	30.10	344.79
BEDROOM	Number of bedrooms	2.46	0.87	1.00	5.00
FLOOR	Floor level of the apartment	19.15	10.78	1.00	53.00
V_PARK_COMM	1 = the apartment has a view of the nearest community park, 0 otherwise	0.32	0.47	0	1
V_PARK_CITY	1 = the apartment has a view of the nearest city park, 0 otherwise	0.21	0.41	0	1
V_PARK_COUNTRY	1 = the apartment has a view of the nearest country park, 0 otherwise	0.06	0.24	0	1

Table 2. *Cont.*

Variable	Description	Mean	SD	Min	Max
Independent variable (complex level)					
SUBWAY	1 = the apartment is close to the subway station (500 m buffer), 0 otherwise	0.51	0.50	0.00	1.00
HOSPITAL	1 = the apartment is close to the hospital (1.5 km buffer), 0 otherwise	0.41	0.49	0.00	1.00
D_CBD	Distance to the central business district of Shenzhen (km)	23.66	10.00	5.90	45.60
SCHOOL_E	1 = the apartment is located in the catchment zone of key elementary school, 0 otherwise	0.60	0.49	0.00	1.00
SCHOOL_JH	1 = the apartment is located in the catchment zone of key junior high school, 0 otherwise	0.69	0.46	0.00	1.00
WD_ PARK_COMM	Walking distance from the apartment to the nearest community park (100 m)	4.08	3.23	1.3	6.3
WD_ PARK_CITY	Walking distance from the apartment to the nearest city park (100 m)	16.12	12.16	2.1	29
WD_ PARK_COUNTRY	Walking distance from the apartment to the nearest country park (100 m)	48.83	29.34	4.9	68

[a] RMB 1.00 = USD 0.15 as in December 2017.

3.3. Three-Dimensional Spatial Multilevel Autoregressive Model

This study employs a 3-D spatial multilevel autoregressive model, which is proposed in two closely linked studies by Li et al. [5,23]. This model has been examined to be able to adequately account for all potential spatial effects (including spatial heterogeneity and spatial dependence) in the 3-D spatial context of a populous modern city, so as to enhance the model robustness and improve the estimate accuracy.

This method integrates the 3-D spatial weights schemes proposed by Li et al. [5,23] into the spatial multilevel autoregressive model proposed by Dong et al. [6]. The spatial multilevel autoregressive model can be expressed as follows:

$$P = \rho WP + A\beta + C\gamma + \Delta\theta + \varepsilon$$

$$\theta = \lambda M\theta + u$$

$$\Delta = \begin{bmatrix} l_1 & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & l_J \end{bmatrix}$$

$$\varepsilon \tilde{N}(0,\ I_N\sigma_e^2)$$

where P is $N \times 1$ apartment housing price vector data (N is the number of apartments, 16,985); W is a $N \times N$ spatial weight depicting the spatial correlations amongst the apartments; A is a $N \times K$ matrix of independent variables at the apartment level (K is the number of independent variables at the apartment level); β is a $K \times 1$ vector of coefficients of the apartment-level variables to be estimated; C is a $N \times P$ matrix of independent variables at the complex level (K is the number of independent variables at the complex level); γ is a $P \times 1$ vector of coefficients of the complex-level variables to be estimated; Δ is a $N \times J$ matrix with block diagonal element equal to 1 (J denotes the number of complex-level units, 24); θ is a $J \times 1$ vector of random contextual effects reflecting complex-level heterogeneity; M is a $J \times J$ spatial weights matrix depicting the spatial correlations amongst the complexes; λ represents a parameter measuring the intensity of spatial dependence at the complex level; ε is a vector that represents the residuals at the apartment level that are distributed as $N\left(0,\ I_N\sigma_e^2\right)$; u is a vector that denotes the residuals at the complex level, which are distributed as $N\left(0,\ I_J\sigma_u^2\right)$; and I_N and I_J are identity matrices.

In this model, there are two spatial weights matrices to be constructed, the complex-level matrix M and the apartment-level matrix W. M is defined as a 24×24 inverse distance weights matrix, based on the inverse distance d_{ij}^{-1} between complex i and j calculated from the X and Y coordinates of each complex's centroid, assuming a spatial correlation decrease with the increasing distance between the complexes. A sensitivity analysis [6] was conducted using different threshold distances (e.g., 15 km, 20 km, 25 km, 30 km, etc.), and the results suggest that the spatial correlation amongst the complexes can be neglected when the distance is over 30 km. Therefore, we assume no spatial correlation exists when the distance between the complexes is over 30 km.

The apartment-level W is a large sparse matrix that is composed of 24 block diagonal matrices and the remaining zero matrices. Each block diagonal matrix specifies the spatial dependence amongst apartments within each residential complex. Following the procedure of constructing a 3-D distance-based and contiguity-based spatial weights matrix proposed by Li et al., one 3-D inverse distance weight matrix, three rook's cube contiguity weights matrices, and three queens' cube contiguity weights matrices were constructed [23]. A Monte Carlo simulation was conducted to compare the effectiveness of these seven matrices in capturing the spatial dependence amongst the apartments. The simulation results show the matrix constructed using the Cube Contiguity Queen Second Order method outperforms other matrices and was thus selected as W in this study.

3.4. Model Specification and Estimation

According to the results of the Breusch–Pagan test (23.621, $p > 0.1$), the null hypothesis of homoscedasticity cannot be rejected. To mitigate heteroscedasticity and enhance the goodness-of-fit of the model, a semi-log functional form (only the dependent variable is transformed into the logarithmic form) was employed. A collinearity diagnosis was also conducted, and the result (average variance inflation factor < 10) suggests that the collinearity amongst all independent variables is not significant.

The model was estimated by the Bayesian Markov Chain Monte Carlo (MCMC) simulation method, which is preferred over maximum likelihood and the generalized method of moments when implementing complex spatial models with intricate variance–covariance structures. To retrieve consistent estimates, the Bayesian MCMC sampler converged within 100,000 iterations with a burn-in period (the initial phase of the sampling process where the chain is allowed to reach a state of convergence and stability) of 50,000. The model was estimated using R (version 4.4.2) based on codes adapted from Dong et al. [6].

The marginal implicit price shows the change in the dependent variable (housing price) caused by the change in an independent variable and can be interpreted from the model estimates. Following the empirical practices for interpreting the spatial hedonic model in semi-log form [6,24], the interpretation for the percentage change in apartment price in response to per unit change in the continuous and dummy variables can be expressed as follows:

For continuous variables:

$$\%\Delta P/\Delta X_k = 100 \times \beta_k (1-\rho)^{-1}$$

For dummy variables:

$$\%\Delta P/\Delta X_k = 100 \times [e^{\beta_k (1-\rho)^{-1}} - 1]$$

where β_k refers to the estimated coefficient of the independent variable X_k; ρ refers to the estimated coefficient of the spatial dependence in the apartment transaction price. The marginal implicit prices can be calculated by multiplying the percentage change by the average apartment transaction price.

4. Results

We conducted several tests to investigate the potential spatial heterogeneity and spatial dependence within the dataset. First, the log-likelihood test result (multilevel model versus single-level model; 251.643, $p < 0.01$) suggests the existence of significant spatial heterogeneity and thus the necessity of adopting a multilevel modeling framework. Second, Moran's I test reveals that significant spatial dependence is concurrently present at both the residential complex level (0.081, $p < 0.01$) and apartment unit level (0.093, $p < 0.01$). After using the 3-D spatial multilevel autoregressive model, the Interclass Correlation Coefficient (ICC) value, which indicates the degree of clustering due to naturally occurring hierarchy, has been kept below 0.1 (0.081), suggesting that the variance between complexes has been adequately addressed and therefore can be overlooked. We again conducted Moran's I test on residuals of the 3-D spatial multilevel autoregressive model, and the insignificant statistics at the complex level (0.015, $p > 0.1$) and transaction level (0.021, $p > 0.1$) suggest that spatial dependence was adequately addressed. In sum, these statistical results justify that the 3-D spatial multilevel model can adequately address the complex spatial heterogeneity and 3-D spatial dependence arising in our dataset. The modeling results are presented in Table 3, and the marginal implicit price of significant variables is shown in Table 4.

Table 3. Estimation results using the 3-D spatial multilevel model (using the 3-D spatial weights matrix constructed by the Cube Contiguity Queen Second Order).

	Coefficient	S.E.
Constant	15.59213 ***	0.014
AREA	0.01190 ***	0.000
BEDROOM	0.09856 ***	0.003
FLOOR	0.00609 ***	0.003
SUBWAY	0.15351 ***	0.005
HOSPITAL	0.04868 ***	0.006
SCHOOL_E	0.04665 ***	0.006
SCHOOL_JH	0.17342 ***	0.006
D_CBD	−0.01989 ***	0.000
V_PARK_COMM	0.01870	0.033
V_PARK_CITY	0.13632 *	0.104
V_PARK_COUNTRY	0.26314 ***	0.007
WD_ PARK_COMM	−0.00321 ***	0.000
WD_ PARK_CITY	−0.00602 ***	0.000
WD_ PARK_COUNTRY	−0.00459	0.011
ρ	0.018 ***	0.001
λ	0.202 ***	0.003
σ_u^2	0.296	
σ_e^2	0.026	
ICC	0.081	
log likelihood	6554	
Pseudo R^2	0.766	

* Significant at $p < 0.10$; *** significant at $p < 0.01$.

Table 4. Marginal implicit price based on the modeling results.

	Marginal Implicit Price	
Variable *	% of Apartment Housing Price	RMB
AREA (m^2)	1.2118	74,897.91
BEDROOM	10.0367	620,330.91
FLOOR	0.6202	38,330.11
SUBWAY	16.9205	1,045,795.57
HOSPITAL	5.0822	314,110.35

Table 4. *Cont.*

Variable *	Marginal Implicit Price	
	% of Apartment Housing Price	RMB
SCHOOL-E	4.8652	300,698.19
SCHOOL-JH	19.3152	1,193,806.80
D_CBD (km)	−2.0255	−125,186.50
V_PARK_CITY	14.8916	920,396.73
V_PARK_COUNTRY	30.7299	1,899,309.15
WD_ PARK_COMM (100 m)	−0.3269	−20,203.55
WD_ PARK_CITY (100 m)	−0.6130	−37,889.53

* Only significant variables are retained.

4.1. Homebuyers' Preferences for UP-Related Variables

To investigate homebuyers' willingness to pay for visibility and accessibility to different UPs classified under the three-level park systems in Shenzhen, a total of six UP-related variables (V_PARK_COMM, V_PARK_CITY, V_PARK_COUNTRY, WD_PARK_COMM, WD_PARK_CITY, and WD_PARK_COUNTRY) were adopted.

4.1.1. Effects of Visibility of Different UPs on Housing Prices

Notably, owning a view of both city parks and country parks from the apartment has significant positive influence on housing prices, with a premium of 14.8916% (RMB 920,396.73) and 30.7299% (RMB 1,899,309.15), respectively. Intuitively, homebuyers are willing to pay a premium for green views that can be enjoyed right from the balcony. In busy city life, the tranquility, leisure, and comfort brought by green scenery is highly yearned for by residents [11,18]. The fact that country parks bring more than twice the scenery benefits of city parks may be explained by the following two reasons. First, ranking the top level under the three-level park system, country parks are generally rarer compared to city parks. Homebuyers may consider the country parks to be more exclusive and prestigious and are willing to pay a premium for this exclusivity. Second, country parks generally have larger areas of greenness that can provide a greater greenery view and a better sense of naturalness and tranquility, which are highly desirable by homebuyers who are looking for a peaceful, natural setting to call home [25]. Therefore, the greater visual appeal can be explained by the scarcity, the abundance of green resources, and the tranquility and privacy of the country park.

It is interesting to find that the response to visual exposure from community parks is insignificant in the sample, indicating that homebuyers do not appreciate the eco–economic value of viewing community parks. According to the Shenzhen Municipal Bureau of Planning and Natural Resources [19–21], the construction of community parks relies largely on "fragmented land" in urban corners (e.g., regreening in idle corners, gray space under bridges, etc.) as a countermeasure to the inefficient urban green spaces, to provide a place for specific functional use (mostly recreation and exercise) for nearby residents [18]. However, the views of green spaces provided by these community parks are normally very limited. In addition, having a view of these greenspaces may indicate suffering the noise generated from community events (e.g., square dancing, children playing) more easily. These potential factors may impair the appeal of the visibility of the community parks and therefore explain the insignificance of the variable.

4.1.2. Effects of Accessibility of Different UPs on Housing Prices

Regarding accessibility, shortening the walking distance by 100 m to the nearest community park and city park can attach a premium to the housing price by 0.3269% (RMB 20,203.55) and 0.6130% value gain (RMB 37,889.53), respectively. Shenzhen's convenient 1018 community parks serve as infrastructure for people's livelihood, hosting the main places for nearby residents to have fun, exercise, and chat in their leisure moments. Most residents can access the community parks within 500 m by walking, and the high accessibility has become an indispensable part of the lives of nearby residents. Compared with community parks, Shenzhen's 187 urban parks constitute the green trunk of the city, highlighting the city's culture and taste. For example, Shenzhen Bay Park not only provides citizens and tourists with a multi-functional area integrating fitness sports, sightseeing, the experience of nature, and other multi-functional activities but also becomes a symbol of the charm and image of Shenzhen's modern coastal city [19–21]. Such a city park hub undoubtedly radiates the daily activities of the residents of the surrounding communities and promotes the rapid development of housing prices in the vicinity. The different roles played by community parks and city parks in Shenzhen have led to a stepwise distribution of the accessibility gains they bring to urban green spaces [26,27].

Counterintuitively, unlike community parks and city parks, the hedonic value of accessibility to country parks is insignificant. Shenzhen's 33 natural country parks have consolidated the urban ecological foundation, and as urban green lungs, their ecological role cannot be ignored; however, the root of this insignificant result may lie in the following reasons [19–21]. First, the average walking distance of the communities in this study was more than 4800 m from the country parks, and such a long distance made residents lose willingness to walk to these parks. They may choose to arrive at these country parks by car or public transportation occasionally. Second, most of the country parks are located on the outskirts of Shenzhen, and limited transportation capacity and security conditions make them less appealing to homebuyers. Third, residents would rather perform activities in community and city parks relatively close to the community, since they may not be able to spare extra time according to a tight schedule to enjoy themselves in country parks with higher eco–economic value [18,28–30].

4.2. Homebuyers' Preferences for Control Variables

Structural variables (i.e., AREA, BEDROOM, and FLOOR) all have a significant impact on housing prices in Shenzhen at the 1% level, which also dovetails with other scholar's studies [18,26,31,32]. Each additional square meter of area corresponds to a 1.2118% increase in housing prices (RMB 74,897.91). This outcome suggests a preference among Shenzhen homebuyers for larger commercial housing units, since larger living spaces allow people to fulfill more wishes and entertain their friends more often. Increasing one more bedroom results in a 10.0367% rise in housing prices (RMB 620,330.91), which underscores the preference of Shenzhen homebuyers for apartments with a greater number of bedrooms. Furthermore, increasing the floor level of apartments also exhibits a positive relationship with housing prices [23,33]. Elevating the apartment's floor by one level corresponds to a 0.6202% increase in housing price (RMB 38,330.11). The higher residential housing prices associated with higher floor levels suggest that Shenzhen homebuyers seek open access to expansive blue–green spaces and city views. Attribute variables all bring significant gains to the value of the house, indicating that savvy homebuyers are looking for apartments with more space, more bedrooms, and sweeping views of Shenzhen [23].

As for locational and neighboring factors (i.e., SUBWAY, HOSPITAL, SCHOOL-E, SCHOOL-JH, and D_CBD), they also exhibit noteworthy influence on housing prices in Shenzhen. Each of these factors contributes to an improvement in housing prices. The impact of subway accessibility on apartment prices is substantial, with an approximate 17% increase (RMB 1,045,795.57), which underscores the homebuyers' emphasis on transportation convenience within their vicinity, striving to reduce commute times through efficient and accessible transport options. This observation highlights the pivotal role of transportation infrastructure, including subways, buses, and well-developed road networks, in shaping community preferences [33,34]. In the context of healthcare facilities, the presence of hospitals within the community vicinity results in a 5.0822% surge in apartment prices (RMB 314,110.35), which reflects residents' desire for proximate access to mature medical services, ensuring prompt and advanced healthcare, thus safeguarding their physical and mental well-being. Regarding educational facilities, both key primary and junior high schools exert a positive influence on apartment prices. Notably, being located in the catchment zone of a key elementary school and key junior high school leads to a premium attached to the housing price of 4.8652% (RMB 300,698.19) and 19.3152% (RMB 1,193,806.80), respectively. This emphasizes the paramount importance that Chinese homebuyers place on the educational environment and schools for their children, seeking high-quality educational resources and nurturing opportunities. Shortening the distance to the center business district by 1 km leads to a 2.0255% (RMB 125,186.50) increase in the average housing price, which underscores the preference among buyers for residing in closer proximity to the city center, allowing access to comprehensive resources and social services, as well as facilitating easier commuting compared to suburban areas [18,25]. The results reveal that homebuyers generally yearn for communities with developed transportation, mature medical facilities, an advanced education environment, and convenience to the city center [5,26,33].

5. Discussion

This study delves into the valuation of park views, particularly focusing on the perceived premium associated with country parks. It posits that the exclusivity and prestige of country parks, coupled with their expansive greenery and the sense of tranquility they offer, contribute to their greater visual appeal and the willingness of homebuyers to pay a premium. However, the current methodology does not account for a comprehensive viewshed analysis, which could reveal additional nuances in how visual access to parks influences property values. The potential for residences near country parks to enjoy a larger viewshed is a factor that may significantly affect valuation but is not fully captured in the study's current approach.

This limitation is also evident in the findings regarding community parks, where the insignificance of visual exposure may be attributed to the limited viewshed and potential noise pollution from community events. These factors underscore the need for a more detailed analysis of viewsheds in future research to better understand the ecological and economic value of urban park views. Incorporating such analysis would offer a more nuanced understanding of how different types of parks, from community to country levels, influence housing values and resident preferences, moving beyond the current constraints to provide deeper insights into the complexities of urban park valuation.

While this study has established a correlation between reduced walking distances to parks and increased housing prices, it acknowledges that accessibility is a multifaceted construct that extends beyond mere proximity. The study's focus on walking distance as an initial measure of accessibility is a starting point, but it is recognized that a more holistic approach is necessary. Future iterations of this research will encompass a broader range of factors that contribute to accessibility, such as traffic intensity, road width, and walkability, to provide a more comprehensive assessment of how these elements influence the value of housing in relation to urban green spaces. This enhanced methodology will offer a more accurate reflection of the accessibility premium and its impact on housing prices in the context of Shenzhen's diverse park systems.

6. Conclusions

This study provides an in-depth examination of the value of different types of urban parks in Shenzhen using the hedonic price method. Our results underscore the significant positive influence of both city parks and country parks on housing prices. This reflects the willingness of homebuyers to pay a premium for the green views that can be enjoyed from their residences and highlights the importance of these spaces in enhancing the quality of life for urban residents [11,18]. We also found that the accessibility to community parks and city parks significantly increases housing prices, highlighting the importance of having a park within walking distance for urban inhabitants [5,26]. However, accessibility to country parks was not found to have a significant impact on housing prices, suggesting that homebuyers may not consider accessibility to country parks as important as other types of parks due to factors such as distance and limited transportation capacity [18,28,29].

Our findings provide timely insights for decision makers in allocating resources and making investment decisions about park development and management. The study underscores the importance of visible and accessible greenspaces in fostering sustainable urban growth and improving the overall quality of life for residents. We hope that the results of this study will aid in formulating strategies for ecological civilization construction and contribute to the creation of more sustainable and livable cities in China [14,23,28,34–36]. Future research could extend this study by investigating the effects of other types of public spaces (e.g., plazas, streetscapes, waterfronts) on housing prices and by examining the impacts of urban parks in other cities in China and around the world. Additionally, future research could also consider other factors, such as the design and maintenance of the parks, that may influence their value [23,25].

In conclusion, this study has shed light on the value of urban parks in Shenzhen and has highlighted the importance of these spaces in fostering sustainable urban development. Our findings underline the need for continued investment in urban park development and management, emphasizing the role of these spaces in enhancing the overall quality of life for urban residents.

The study's nuanced conclusions regarding the influence of country parks, city parks, and community parks on housing prices in Shenzhen reveal that while city parks and country parks significantly impact property values, reflecting homebuyers' premium for green views and the enhancement of urban quality of life, accessibility to country parks did not significantly influence housing prices. This may be attributed to factors such as distance and transportation limitations, suggesting that mediating factors like recreational opportunities and infrastructure must be considered when evaluating park impacts on property values. For city parks, their central location and amenities make them highly valuable, with mediating factors potentially including the diversity of activities, park design, and social interactions. Community parks, despite their proximity, show an insignificant response to visual exposure, possibly due to their smaller size and noise pollution from events, indicating that immediate recreational opportunities may overshadow viewshed considerations. These conclusions underscore the importance of understanding the specific characteristics and amenities of each park type, along with the mediating factors that influence their value to the community, for urban planners and policymakers. Future research should broaden the scope to include other public spaces, examine urban parks in different cities, and consider additional factors like park design and maintenance to fully grasp the multifaceted value of urban parks.

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References

1. Anderson, S.T.; West, S.E. Open space, residential property values, and spatial context. *Reg. Sci. Urban Econ.* **2006**, *36*, 773–789. [CrossRef]
2. Bae, J.; Ryu, Y. Land use and land cover changes explain spatial and temporal variations of the soil organic carbon stocks in a constructed urban park. *Landsc. Urban Plan.* **2015**, *136*, 57–67. [CrossRef]
3. Bartier, P.M.; Keller, C.P. Multivariate interpolation to incorporate thematic surface data using inverse distance weighting (IDW). *Comput. Geosci.* **1996**, *22*, 795–799. [CrossRef]
4. Brasington, D.M.; Hite, D. A mixed index approach to identifying hedonic price models. *Reg. Sci. Urban Econ.* **2008**, *38*, 271–284. [CrossRef]
5. Chen, W.Y.; Li, X. Cumulative impacts of polluted urban streams on property values: A 3-D spatial hedonic model at the micro-neighborhood level. *Landsc. Urban Plan.* **2017**, *162*, 1–12. [CrossRef]
6. Dong, G.; Harris, R.; Jones, K.; Yu, J. Multilevel modelling with spatial interaction effects with application to an emerging land market in Beijing, China. *PLoS ONE* **2015**, *10*, e0130761. [CrossRef] [PubMed]
7. Dwyer, J.F.; Peterson, G.L.; Darragh, A.J. Estimating the value of urban forests using the travel cost method. *J. Arboric.* **1983**, *9*, 182–185. [CrossRef]
8. Fuller, R.A.; Gaston, K.J. The scaling of green space coverage in European cities. *Biol. Lett.* **2009**, *5*, 352–355. [CrossRef]
9. Haq, S.M.A. Urban green spaces and an integrative approach to sustainable environment. *J. Environ. Prot.* **2011**, *2*, 601–608. [CrossRef]
10. Herath, S.; Maier, G. *The Hedonic Price Method in Real Estate and Housing Market Research: A Review of the Literature*; WU Vienna University of Economics and Business: Vienna, Austria, 2010.
11. Kong, F.; Yin, H.; Nakagoshi, N. Using GIS and landscape metrics in the hedonic price modeling of the amenity value of urban green space: A case study in Jinan City, China. *Landsc. Urban Plan.* **2007**, *79*, 240–252. [CrossRef]
12. CRIC. Average Transaction Price in Futian District (2006–2021). 2022. Available online: https://vip.cric.com/login (accessed on 11 September 2022).
13. Hillsdon, M.; Panter, J.; Foster, C.; Jones, A. The relationship between access and quality of urban green space with population physical activity. *Public Health* **2006**, *120*, 1127–1132. [CrossRef]
14. Li, H.; Wei, Y.D.; Wu, Y.; Tian, G. Analyzing housing prices in Shanghai with open data: Amenity, accessibility, and urban structure. *Cities* **2019**, *91*, 165–179. [CrossRef]
15. Liu, H.; Hu, Y.; Li, F.; Yuan, L. Associations of multiple ecosystem services and disservices of urban park ecological infrastructure and the linkages with socioeconomic factors. *J. Clean. Prod.* **2018**, *174*, 868–879. [CrossRef]
16. Wen, H.; Zhang, Y.; Zhang, L. Assessing amenity effects of urban landscapes on housing price in Hangzhou, China. *Urban For. Urban Green.* **2015**, *14*, 1017–1026. [CrossRef]
17. Wu, C.; Du, Y.; Li, S.; Liu, P.; Ye, X. Does visual contact with green space impact housing prices? An integrated approach of machine learning and hedonic modeling based on the perception of green space. *Land Use Policy* **2022**, *115*, 106048. [CrossRef]
18. Wu, C.; Ye, X.; Du, Q.; Luo, P. Spatial effects of accessibility to parks on housing prices in Shenzhen, China. *Habitat Int.* **2017**, *63*, 45–54. [CrossRef]
19. Shenzhen Municipal Bureau of Planning and Natural Resources. Shenzhen Park City Construction Master Plan and Three-Year Action Plan (2022–2024). 28 May 2022. Available online: http://www.sz.gov.cn/cn/xxgk/zfxxgj/tzgg/content/post_9826193.html (accessed on 11 September 2022).
20. Shenzhen Statistics Bureau. Shenzhen Statistical Yearbook 2021. 2021. Available online: https://tjj.sz.gov.cn/zwgk/zfxxgkml/tjsj/tjnj/content/post_9491388.html (accessed on 11 September 2022).

21. Shenzhen Urban Management and Comprehensive Law Enforcement Bureau. Public Green Areas per Capita in Shenzhen in 2021. 2022. Available online: http://cgj.sz.gov.cn/gkmlpt/content/10/10107/post_10107755.html#438 (accessed on 11 September 2022).
22. Baidu Map. Overall Distribution of 24 Targeting Communities and Parks. 2022. Available online: https://map.baidu.com/ (accessed on 11 September 2022).
23. Li, X.; Chen, W.Y.; Cho FH, T.; Lafortezza, R. Bringing the vertical dimension into a planar multilevel autoregressive model: A city-level hedonic analysis of homebuyers' utilities and urban river attributes. *Sci. Total Environ.* **2021**, *772*, 145547. [CrossRef]
24. Li, H.; Chen, P.; Grant, R. Built environment, special economic zone, and housing prices in Shenzhen, China. *Appl. Geogr.* **2021**, *129*, 102429. [CrossRef]
25. Jim, C.Y.; Chen, W.Y. Impacts of urban environmental elements on residential housing prices in Guangzhou (China). *Landsc. Urban Plan.* **2006**, *78*, 422–434. [CrossRef]
26. Swanwick, C.; Dunnett, N.; Woolley, H. Nature, role and value of green space in towns and cities: An overview. *Built Environ.* **2003**, *29*, 94–106. [CrossRef]
27. Wolch, J.R.; Byrne, J.; Newell, J.P. Urban green space, public health, and environmental justice: The challenge of making cities 'just green enough'. *Landsc. Urban Plan.* **2014**, *125*, 234–244. [CrossRef]
28. Tan, R.; He, Q.; Zhou, K.; Xie, P. The effect of new metro stations on local land use and housing prices: The case of Wuhan, China. *J. Transp. Geogr.* **2019**, *79*, 102488. [CrossRef]
29. Tu, X.; Huang, G.; Wu, J.; Guo, X. How do travel distance and park size influence urban park visits? *Urban For. Urban Green.* **2020**, *52*, 126689. [CrossRef]
30. Yu, Y.; Zhang, W.; Fu, P.; Huang, W.; Li, K.; Cao, K. The spatial optimization and evaluation of the economic, ecological, and social value of urban green space in Shenzhen. *Sustainability* **2020**, *12*, 1844. [CrossRef]
31. Zhang, L.; Chen, P.; Hui, F. Refining the accessibility evaluation of urban green spaces with multiple sources of mobility data: A case study in Shenzhen, China. *Urban For. Urban Green.* **2022**, *70*, 127550. [CrossRef]
32. Zhao, Y.; Wang, N.; Luo, Y.; He, H.; Wu, L.; Wang, H.; Wang, Q.; Wu, J. Quantification of ecosystem services supply-demand and the impact of demographic change on cultural services in Shenzhen, China. *J. Environ. Manag.* **2022**, *304*, 114280. [CrossRef] [PubMed]
33. Xu, Z.; Cheng, G.D.; Zhang, Z.; Su, Z.; Loomis, J. Applying contingent valuation in China to measure the total economic value of restoring ecosystem services in Ejina region. *Ecol. Econ.* **2003**, *44*, 345–358.
34. Yang, L.; Chen, Y.; Xu, N.; Zhao, R.; Chau, K.W.; Hong, S. Place-varying impacts of urban rail transit on property prices in Shenzhen, China: Insights for value capture. *Sustain. Cities Soc.* **2020**, *58*, 102140. [CrossRef]
35. Liu, B.; Tian, Y.; Guo, M.; Tran, D.; Alwah, A.A.Q.; Xu, D. Evaluating the disparity between supply and demand of park green space using a multi-dimensional spatial equity evaluation framework. *Cities* **2022**, *121*, 103484. [CrossRef]
36. Wen, H.; Bu, X.; Qin, Z. Spatial effect of lake landscape on housing price: A case study of the West Lake in Hangzhou, China. *Habitat Int.* **2014**, *44*, 31–40. [CrossRef]